[redacted]

~~TOP SECRET~~

CoR-0528

COPY 1 OF 1

June 26, 1959

Dear John:

Will you please see that this gets routed to Mr. B., the Ops people and anyone you think would be interested. This report contains the information which we had available at launch plus eight hours.

Very truly yours,

Jack

Jack B. Linn

JBL:ej
Enc. 1

~~TOP SECRET~~

SECRET

INSTRUCTIONS FOR USE

This cover sheet is to be attached as a cover to all documented Secret mation and remain attached thereto until such time as the information is (1) p in permanent file folders, or made part of a permanent record (2) transmitte U. S. Registered mail (3) destroyed.

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__WHEN UNAUTHORIZE__ [illegible] covered, turned face down, placed in storage container, or otherwise pro

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— NOTICE —

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SECRET

~~TOP SECRET~~

LOCKHEED AIRCRAFT CORPORATION
MISSILE SYSTEMS DIVISION
INTERDEPARTMENTAL COMMUNICATION
~~TOP SECRET~~

Encl 1 to [illegible]

CWL-0528

COPY 1 OF 1

~~LMSD/131861~~

TO Lt. Col. C. G. Mathison

DATE 25 June 1959

FROM R. D. King

DEPT. 61-30 PLANT 1 EXT. 26242

SUBJECT: PRELIMINARY FLIGHT INFORMATION LETTER - DISCOVERER IV

The second launch countdown for Discoverer IV on Pad 5 at Vandenberg Air Force Base was successfully conducted on 25 June 1959, commencing at 0445 PDT and culminating in launch at 1547:45. Technical difficulties associated with 1st stage destruct package installation, 2nd stage beacon verification checks, and 2nd stage propellant tanking caused countdown delays totaling approximately 4 1/2 hours.

The lift-off was without incident. Initial report indicates a small pad fire occurred, resulting in only a minimum pad damage. (This was the first launch from Pad 5). Main engine cutoff was at 158.5 seconds after launch. However, a lower-than-nominal trajectory was recorded by the Mod II radar. Also a departure azimuth approximately 4 degrees west of the 175° nominal value was indicated by preliminary radar tracking information.

The lower trajectory required an earlier-than-nominal 2nd stage engine ignition, and as a result the "time-to-fire" computer commanded beacon command 6 at 215 seconds rather than the programmed command 5 (D-timer hold). This command 6 thus cancelled the backup 20-second D-timer hold as programmed by the Fairchild timer, allowing the earliest possible engine ignition. Command 6 (velocity increment to be gained setting) was satisfactorily received and was held for 13.5 seconds. This duration programmed a velocity to be gained of 13,090 ft/sec.

A second stage engine burning time of approximately 116 seconds, 1 second greater than the pre-launch nominal, was recorded. The ascent trajectory, as based upon preliminary radar data, was as shown in Figures 1 through 3. Pre-flight nominal trajectory data are compared with preliminary flight data in Table 1.

Launch tracking operations were generally satisfactory. Telemetry data were obtained at VAFB, Pt. Mugu, Van Nuys and the telemetry ship stations to a limit of 573 seconds from launch. However, the received signals were reportedly somewhat noisy at all stations. Nevertheless, it is believed that sufficient data will be available for a complete analysis of vehicle functions.

~~TOP SECRET~~

[illegible] AFFECTING THE NATIONAL DEFENSE OF THE UNITED STATES WITHIN THE MEANING OF THE [illegible] LAWS, TITLE [illegible] ON OR REVELATION OF ITS CONTENTS [illegible]

[illegible]

PRELIMINARY FLIGHT INFORMATION LETTER
DISCOVERER IV

Apparently very good radar track was maintained until 385 seconds after launch, or 28 seconds beyond stage burnout, with a degradation of data occurring to the loss of track at 429 seconds after launch. Preliminary trajectory based on the Pt. Mugu radar track was utilized by the Palo Alto Computer Center for estimating orbital elements as shown in Table 2. These data are exceptionally smooth, however, final determination of accuracy will depend upon a comparison with the FPS-16 radar and metric optics data from the Pacific Missile Range (data not yet available).

The results of the computer predictions show that the ability to achieve orbit was extremely marginal. A study indicated that a reduction in velocity of only ~30 ft/sec from that shown in Table 2 (25,605 ft/sec) would be sufficient to make the difference between orbital achievement or failure.

Orbital tracking operations were conducted in the prescribed manner for passes 1 and 2. No acquisition was achieved by any of the stations. Due to this failure to acquire and the marginal nature of the computed orbital elements, it is believed that orbit was not achieved. However, attempts to track passes 8 and 9 will be made by the Alaskan stations and Atlantic Missile Range stations.

Satisfactory inter-stations communications were maintained throughout the operation except for the VAFB tracking station to Pt. Mugu hot-line which went out of service 2 minutes before launch. This did not handicap the operation.

Telemetry data necessary to verify functional operation of airborne equipments is expected to become available in usable form within the next 12 hours. The limited trajectory information now available, however, indicates that no significant equipment malfunctions occurred.

R D King

R. D. King

RDK:mja

J. Plummer
C. D. Lindberg
S. K. Hutchin
R. G. Gavlak
B. H. Marsh
R. J. Naegale
D. H. Witcher
W. R. Abbott
W. H. Smith
L. F. Morgan
F. W. O'Green
R. D. King
R. Smelt
Lt. Col. C.G.Mathison(2)

~~TOP SECRET~~

[illegible] INFORMATION AFFECTING THE NATIONAL DEFENSE OF THE UNITED STATES WITHIN THE MEANING OF THE ESPIONAGE LAWS, TITLE [illegible] REVELATION OF ITS CONTENTS IN ANY MANNER TO AN UNAUTHORIZED PERSON IS PROHIBITED BY LAW.

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LMSD/104061

PRELIMINARY

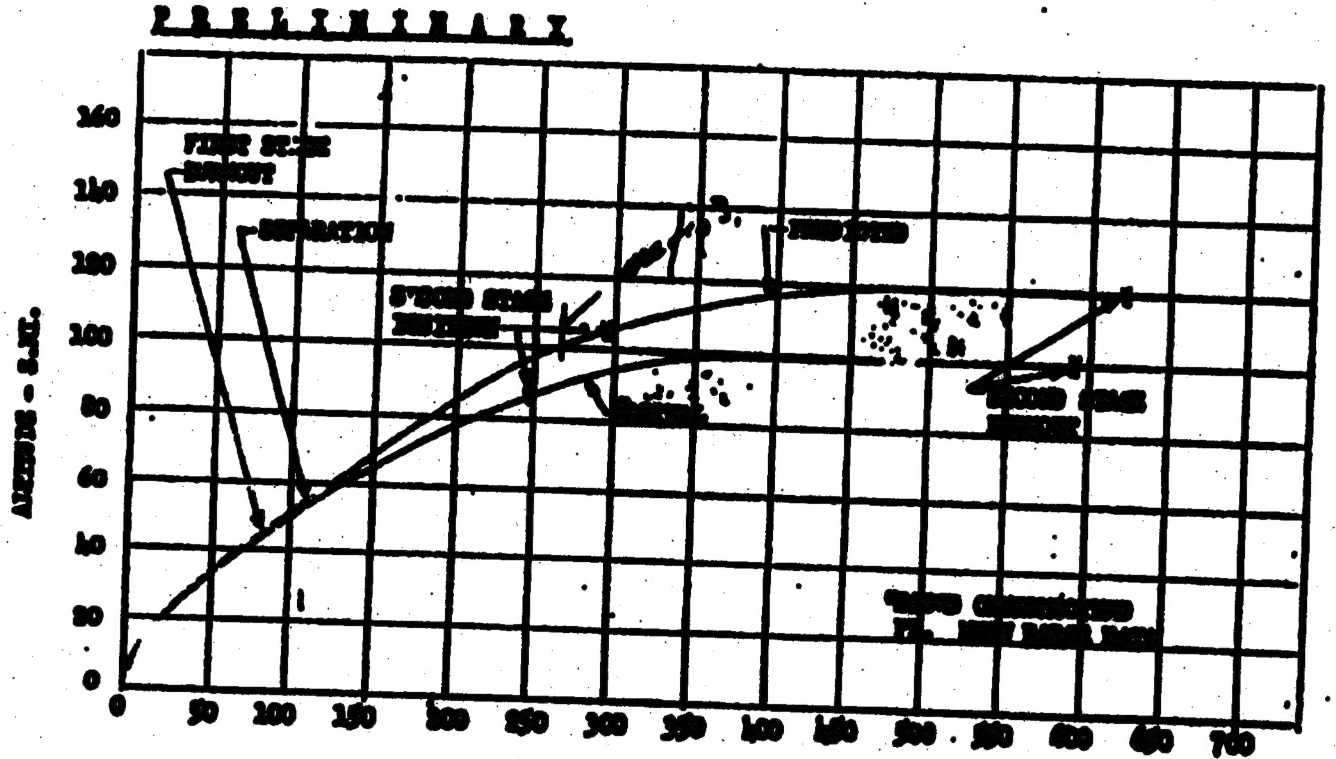

Figure 3. ALTITUDE VS RANGE, DISCOVERER IV

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[illegible]

LMSD/131362

P R E L I M I N A R Y

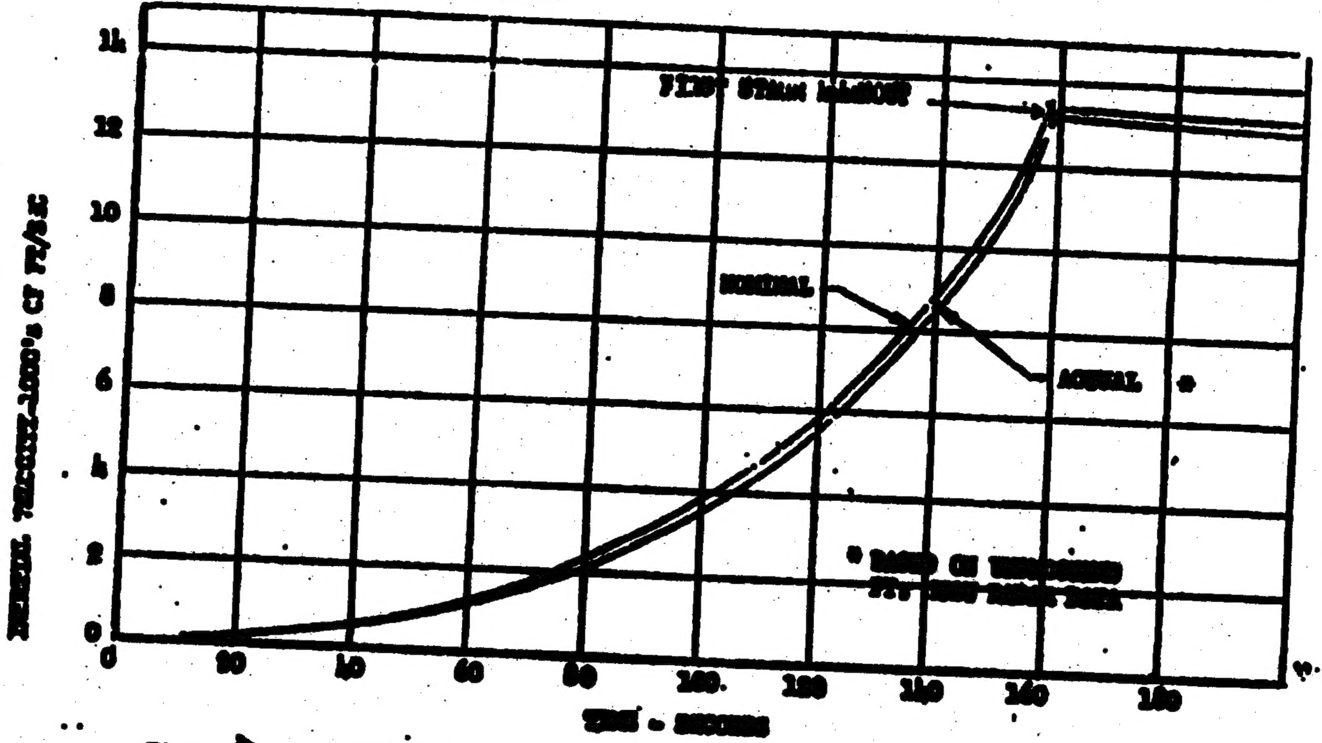

Figure [illegible]. VELOCITY VS TIME DURING THOR BOOST, DISCOVERER IV

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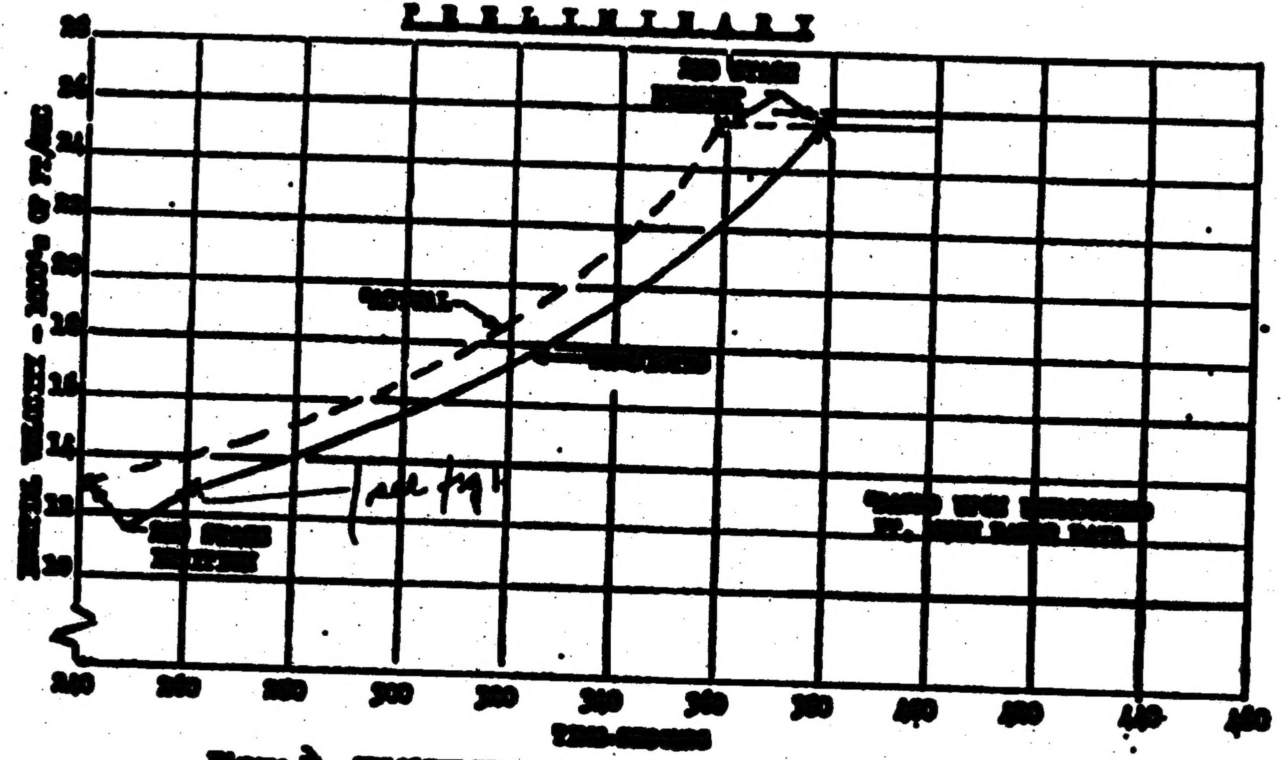

Figure-3. VELOCITY VS TIME DURING ORBITAL BOOST, DISCOVERER IV

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[illegible]

P R E L I M I N A R Y

	TIME (SEC)		ALTITUDE (N.MI.)		RANGE (N.MI.)		INERTIAL VELOCITY (FT/SEC)	
	PRED.	ACTUAL	PRED.	ACTUAL*	PRED.	ACTUAL*	PRED.	ACTUAL*
THOR BURNOUT	158.5	158.5	48	45	81	82	13600	13,900
DISCOVERER IGNITION	263	261	105	87	296	249	13,020	12,850
DISCOVERER BURNOUT	378	397	118	102	605	587	25,491	25,405

* BASED UPON UNCORRECTED PT. MUGU RADAR DATA

TABLE 1. [illegible] TRAJECTORY PARAMETERS, DISCOVERER IV

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P_R_E_L_I_M_I_N_A_R_Y

	PLANNED.	ACTUAL*
INSERTION VELOCITY (FT/SEC)	25691 (INERTIAL)	25605 (INERTIAL)
INSERTION ANGLE (DEG)	0	0.2°
INCLINATION ANGLE (DEG)	83.6	86.3
PERIGEE (S.MI.)	130	86
APOGEE (S.MI.)	202	210
ECCENTRICITY	.01	.009
PERIOD (MIN)	89.66	87.6
LIFETIME (DAYS)	4.5mo	1/2 rev

* BASED UPON UNCORRECTED PT. MUGU RADAR DATA
**LIFETIME BASED [illegible] AND [illegible] FLIGHT DURING 1ST DAY, [illegible] A reduction in the estimated velocity at insertion of 30 ft/sec reduces the lifetime to less than one revolution.

Table 2 DISCOVERER IV ESTIMATED INITIAL ORBITAL ELEMENTS

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